

JUL 17 1989

GENERAL INSTRUCTIONS

1. This test contains 45 multiple-choice questions.
2. You have 50 minutes to complete this test.
3. You must answer all questions.
4. Read each question carefully and choose the best answer.
5. Mark your answer by filling in the circle next to the letter of the best answer.
6. Mark your choice on the separate answer sheet.
7. Use ONLY an HB pencil to mark your answers.



GRADE 9 ACHIEVEMENT TEST

Science

June 1989



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GRADE 9 ACHIEVEMENT TEST

SCIENCE

GENERAL INSTRUCTIONS

1. This test consists of 75 multiple-choice questions.
2. You have 90 minutes to complete this test.
3. The use of approved calculators is recommended.
4. Read each question carefully and follow the specific instructions given.
5. Each question has four possible answers from which you are to choose the CORRECT or BEST answer.
6. Mark your choice on the separate answer sheet provided.
7. Use ONLY an HB pencil to mark your answer.

Example

Answer Sheet

1. This test is for the subject area of

	A	B	C	D
1.	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

- A. Science
- B. Mathematics
- C. Language Arts
- D. Physical Education

8. Mark only one answer for each question. If you change an answer, please erase your first mark completely.
9. Be sure that the number on the answer sheet matches the question you are doing.
10. Your teacher will tell you when to start and when to stop.

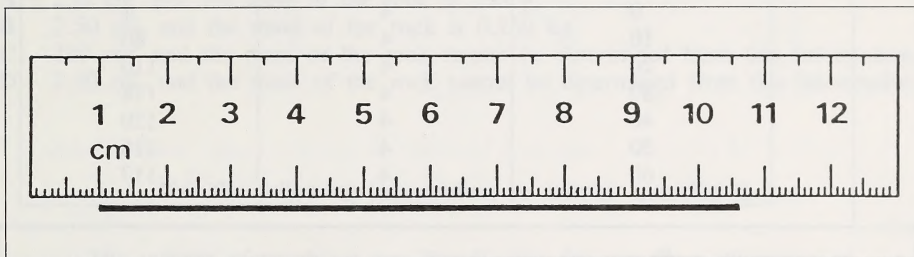
DO NOT TURN THIS PAGE UNTIL YOUR TEACHER TELLS YOU TO DO SO

JUNE 1989

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1. In a graduated cylinder, the top of the meniscus is at the 84.0 mL mark and the bottom of the meniscus is at the 83.0 mL mark. The volume of water in the cylinder is
- A. 83.0 mL
 - B. 83.5 mL
 - C. 83.8 mL
 - D. 84.0 mL

Use the following information to answer question 2.



2. The BEST answer for the length of the line below the ruler is
- A. 10.65 cm
 - B. 10.6 cm
 - C. 9.6 cm
 - D. 9.5 cm

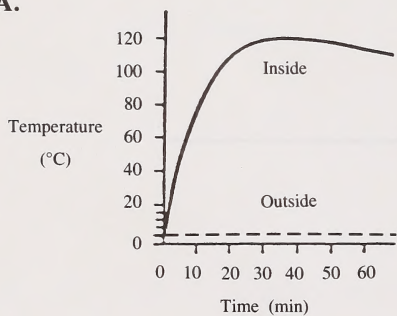
Use the following information to answer question 3.

A student made a solar oven for a science fair project. The solar oven was placed in the sunlight. The temperatures inside and outside the oven were recorded at intervals over a period of one hour and appear in the table below:

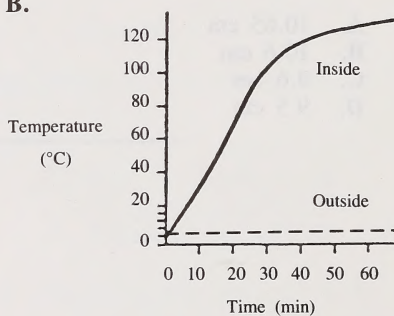
Time (min)	Temperature ($^{\circ}\text{C}$)	
	Outside Oven	Inside Oven
0	4	4
10	4	80
20	4	110
30	4	118
40	4	120
50	4	118
60	4	117

3. The graph that BEST represents the data in the table is

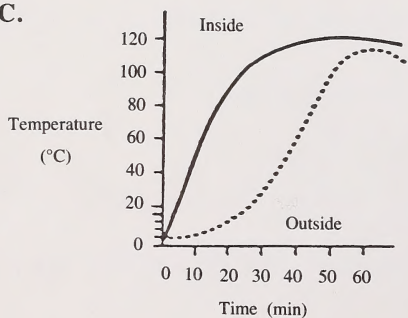
A.



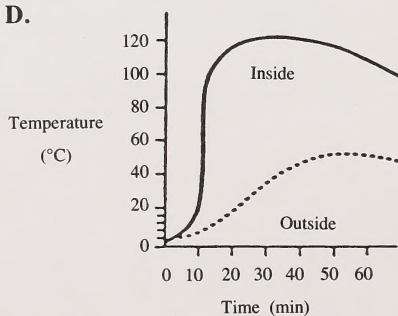
B.



C.

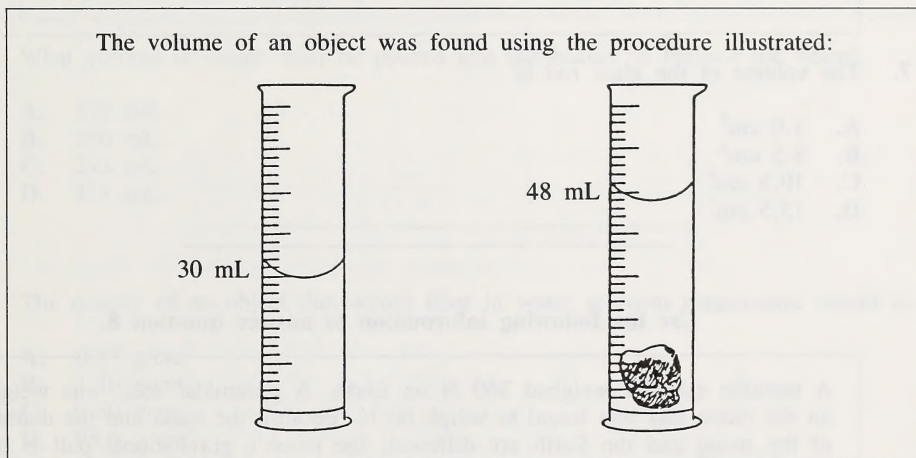


D.



4. Volume is defined as the
- A. space between small particles of matter
 - B. water displaced by objects
 - C. mass within a given volume
 - D. space occupied by matter
5. When a rock is dropped into an overflow can that is full of water, 250 mL of water flows out of the can. The volume of the rock is
- A. 250 cm^3 and the mass of the rock is 250 g
 - B. 2.50 mL and the mass of the rock is 0.250 kg
 - C. 250 cm^3 and the mass of the rock cannot be determined from this information
 - D. 2.50 mL and the mass of the rock cannot be determined from this information

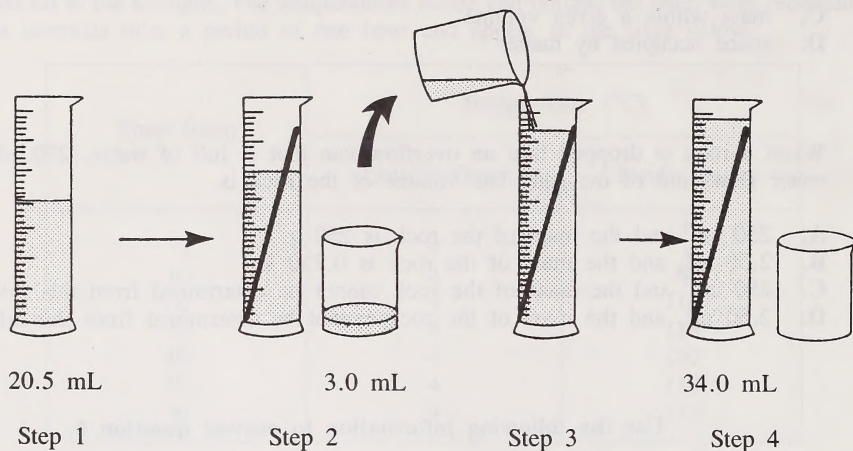
Use the following information to answer question 6.



6. If the mass of the object is 27 g, the density is
- A. 0.56 g/mL
 - B. 0.67 g/mL
 - C. 1.5 g/mL
 - D. 3.4 g/mL

Use the following information to answer question 7.

A student used the procedure illustrated to find the volume of a glass rod.



7. The volume of the glass rod is

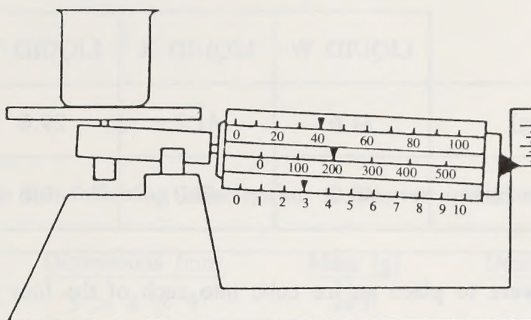
- A. 3.0 cm^3
 - B. 8.5 cm^3
 - C. 10.5 cm^3
 - D. 13.5 cm^3
-

Use the following information to answer question 8.

A metallic cylinder weighed 360 N on Earth. A pyramidal solid was weighed on the moon and was found to weigh 60 N. Because the mass and the diameter of the moon and the Earth are different, the moon's gravitational pull is one-sixth that of the Earth's.

8. In comparing the mass of the metallic cylinder and the mass of the pyramidal solid, one could infer that the
- A. mass comparison cannot be made because of insufficient information
 - B. metallic cylinder has a mass equal to that of the pyramidal solid
 - C. metallic cylinder has a smaller mass than the pyramidal solid
 - D. metallic cylinder has a greater mass than the pyramidal solid
-

Use the following information to answer question 9.



A triple-beam balance is set so that the first rider is on the 40 g mark, the second is on the 200 g mark, and the third is on the 3 g mark. A beaker with a mass of 68 g is placed on the pan.

9. What volume of water must be poured into the beaker to balance the beam?
- A. 175 mL
 - B. 240 mL
 - C. 243 mL
 - D. 311 mL
10. The density of an object that would float in water at room temperature would be
- A. 0.87 g/cm^3
 - B. 1.10 g/cm^3
 - C. 9.50 g/cm^3
 - D. 95.0 g/cm^3

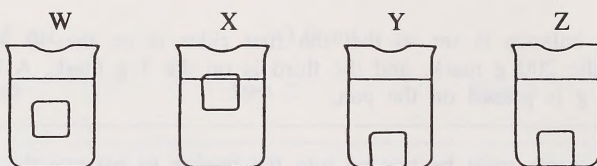
Use the following information to answer question 11.

Ice at 0°C has a density of 0.920 g/cm³

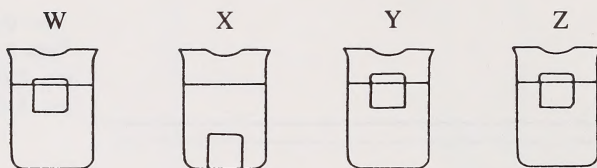
	LIQUID W	LIQUID X	LIQUID Y	LIQUID Z
Mass (g)	31.6	41.2	29.6	64.0
Volume (mL)	40.0	40.0	40.0	40.0

11. If a student were to place an ice cube into each of the four liquids, what might be observed?

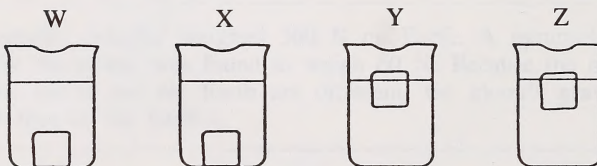
A.



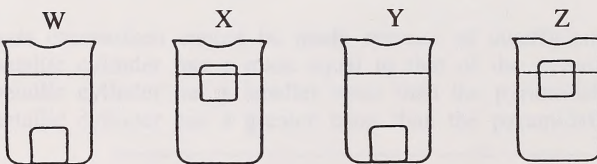
B.



C.



D.



12. 100 mL of water will fill a bottle. 125 g of another liquid will fill the same bottle. The density of the second liquid is
- A. 0.25 g/mL
 - B. 0.80 g/mL
 - C. 1.25 g/mL
 - D. 2.50 g/mL

Use the following information to answer question 13.

Block	Dimensions (cm)	Mass (g)	Density (g/cm ³)
I	$3 \times 2 \times 1$	24.0	4.0
II	$4 \times 2 \times 1$	32.0	4.0
III	$3 \times 2 \times 2$	44.4	3.70
IV	$2 \times 2 \times 2$	6.8	0.85

13. Each block is placed in a graduated cylinder containing water. The block that causes the water level to increase from 20 mL to 26 mL is block
- A. I
 - B. II
 - C. III
 - D. IV
-
14. The spaces between molecules are generally
- A. greater in a solid than in a liquid
 - B. greater in a liquid than in a gas
 - C. smaller in a solid than in a liquid
 - D. smaller in a gas than in a solid
15. When equal volumes of two gases are mixed within a closed container, the molecules of
- A. one replace the molecules of the other
 - B. one displace the molecules of the other
 - C. one prevent the movement of molecules of the other
 - D. each move into the spaces between the molecules of the other

Use the following information to answer question 16.

A group of students listed the properties they thought belonged to matter:

- I Molecules are tiny particles of matter.
- II Molecules are spherical in shape.
- III Molecules do not move in solids.
- IV Spaces exist between molecules.
- V Molecules vary in size.

16. According to the Kinetic Molecular Theory, which statements are correct?

- A. I, II, V
 - B. I, IV, V
 - C. II, III, IV
 - D. III, IV, V
-

Use the following information to answer question 17.

In a student-conducted investigation, the contents of Graduated Cylinder A were added to Graduated Cylinder B. The results are given in the table:

Trial Number	Initial Volume Graduated Cylinder A	Initial Volume Graduated Cylinder B	Final Volume Graduated Cylinder B
1	50 mL water	50 mL water	100 mL
2	50 mL alcohol	50 mL alcohol	100 mL
3	50 mL alcohol	50 mL water	96 mL

17. The BEST explanation for the results is that molecules

- A. are in constant motion
 - B. move at different rates
 - C. have spaces between them
 - D. are attracted to each other
-

18. A student who wants to observe Brownian motion could
- A. dissolve colored salt in water without stirring the water
 - B. view magnified smoke particles suspended in air
 - C. allow sand to settle in a tall container of water
 - D. combine two liquids that have different colors
19. Identify the statement that BEST explains why a balloon expands as it is filled with air.
- A. The molecules of the balloon expand.
 - B. The air molecules expand to fill the balloon.
 - C. The molecules of the balloon form a skin that encloses empty space inside the balloon.
 - D. Air molecules on the inside exert greater force than the air molecules on the outside of the balloon.

20. A drop of food coloring is gently added to 25 mL of water that is very still. The color spreads throughout the water because
- A. food coloring molecules are larger than water molecules
 - B. water molecules are larger than food coloring molecules
 - C. the food coloring molecules and the water molecules are in constant motion
 - D. a chemical reaction occurs between the water molecules and the food coloring molecules

Use the following information to answer question 21.

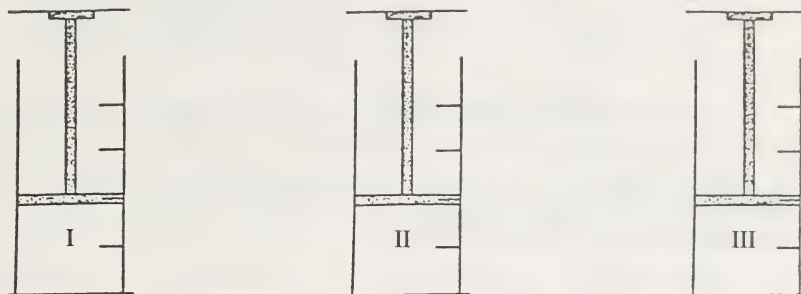
These statements deal with the movement of molecules in the three states of matter:

- I Molecules vibrate about a fixed position.
- II Molecules move at high speeds in all directions.
- III Molecules are able to slide or move over one another.

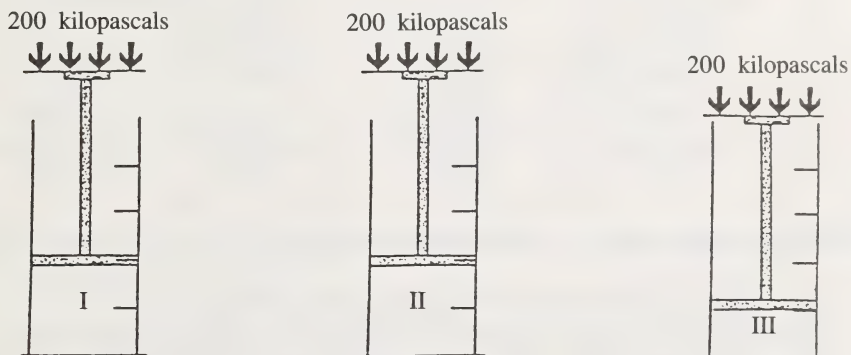
21. The three states of matter that correspond to statements I, II, and III respectively are
- A. gas, liquid, and solid
 - B. solid, liquid, and gas
 - C. liquid, gas, and solid
 - D. solid, gas, and liquid
-

Use the following information to answer question 22.

The volume, temperature, and pressure of substances I, II, and III were the same before pressure was applied.



When 200 kilopascals of pressure were applied to all three substances, the following was observed:



I and II – there was no observable change in volume or temperature
 III – the volume decreased and the temperature increased

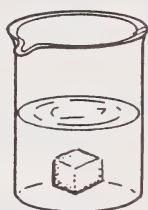
22. The hypothesis that is consistent with the above data is that the states of substances I, II, and III respectively are

- A. solid, liquid, and liquid
- B. solid, solid, and liquid
- C. solid, solid, and gas
- D. gas, liquid, and gas

23. Iodine molecules would diffuse least rapidly in a sample of glycerine that has a temperature of
- A. 4°C
 - B. 15°C
 - C. 34°C
 - D. 62°C

Use the following information to answer questions 24 and 25.

A student designed an experiment to determine the time required for identical sugar cubes to dissolve in equal amounts of water at different temperatures. The experimental design is shown below:



Beaker I
initial
temperature
15°C



Beaker II
initial
temperature
40°C



Beaker III
initial
temperature
65°C



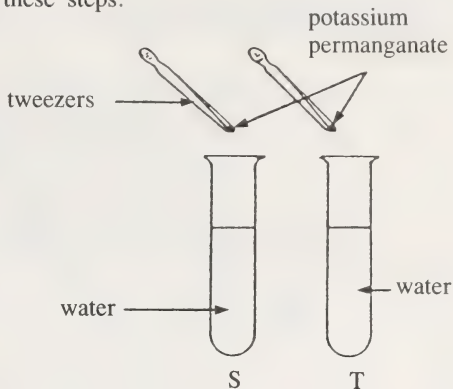
Beaker IV
initial
temperature
90°C

24. Two variables that the student kept constant were the
- A. mass of the sugar cubes and the amount of water used
 - B. size of the beakers and the final temperature of the water
 - C. size of the beakers and the time required to dissolve the sugar cubes
 - D. mass of the sugar cubes and the time required to dissolve the sugar cubes
25. The sugar cube dissolves more rapidly in Beaker IV than in Beaker I because
- A. spaces between the water molecules are smaller in Beaker IV
 - B. spaces between the sugar molecules are larger in Beaker IV
 - C. molecular collisions occur more frequently in Beaker IV
 - D. molecular collisions occur less frequently in Beaker IV
-

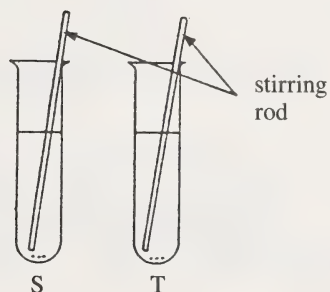
Use the following information to answer question 26.

A student's investigation includes these steps:

1. Selecting two crystals of potassium permanganate and adding one crystal to each of the two test tubes.



2. Stirring both solutions for one minute.



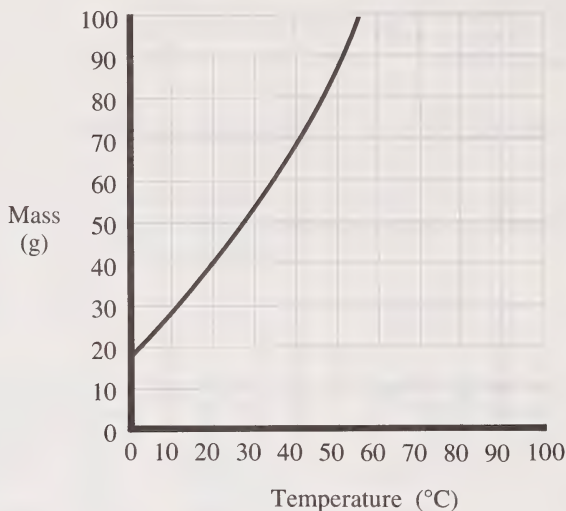
The student observed that the solution in Test tube S turned purple more quickly than the solution in Test tube T.

26. The most appropriate inference is that the solution in Test tube S must have

- A. been stirred less vigorously
- B. been at a higher temperature
- C. had a greater volume of water
- D. had less potassium permanganate

Use the following information to answer questions 27 and 28.

The graph shows the effect of temperature on the mass of a compound that will dissolve in 100 mL of water.



27. As the temperature increases, the mass of the compound that will dissolve
- A. decreases
 - B. increases
 - C. remains constant
 - D. cannot be determined from the graph
28. When 70 g of the compound are added to 100 mL of water at 20°C, the mass that does NOT dissolve is
- A. 20 g
 - B. 30 g
 - C. 40 g
 - D. 70 g
-
29. The rate of evaporation is highest when the weather is
- A. hot, dry, and calm
 - B. hot, dry, and windy
 - C. hot, moist, and calm
 - D. hot, moist, and windy

Use the following information to answer question 30.

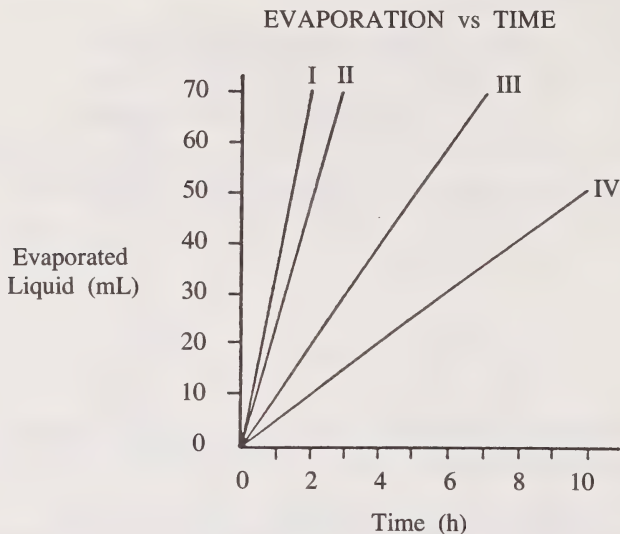
At the class picnic, some Grade 9 Science students suggested four ways to cool a watermelon:

- I Wrap it in a wet towel.
- II Put it in a cold stream.
- III Put it in a shady place.
- IV Wrap it in layers of newspaper.

30. Which suggestion works because evaporation has a cooling effect?
- A. I
 - B. II
 - C. III
 - D. IV
-
31. A swimmer feels a cooling effect after getting out of a swimming pool. This can be explained BEST by the
- A. water releasing heat to the swimmer, causing evaporation
 - B. swimmer releasing heat to the swimming pool while swimming
 - C. water absorbing heat from the swimmer, causing evaporation
 - D. swimmer absorbing heat from the water, causing evaporation
32. A wet shirt dries faster on a clothes hanger than on a table because
- A. diffusion is faster in air
 - B. osmosis depends on surface area
 - C. evaporation increases with temperature
 - D. evaporation is proportional to the exposed surface area

Use the following information to answer question 33.

An experiment was performed that measured the rate of evaporation of water in four different shaped containers. A graph was prepared.

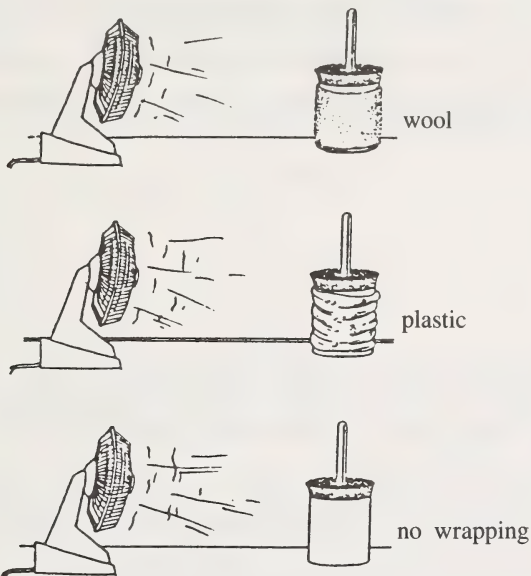


33. The liquid container that most likely had the largest surface area was
- A. I
 - B. II
 - C. III
 - D. IV
-
34. The fixed points on a Celsius thermometer that are accepted by scientists are the
- A. freezing point and boiling point of water
 - B. freezing point and boiling point of mercury
 - C. boiling point of water and the temperature of the human body
 - D. freezing point of water and the temperature of the human body
35. A joule can be a unit of
- A. heat
 - B. area
 - C. volume
 - D. temperature

Use the following information to answer question 36.

A student wanted to determine which fabric, plastic or wool, would make a warmer jacket for a cool, windy day.

The student filled three identical cans with cool water and wrapped one with wool and one with plastic, and left one unwrapped. The student recorded the temperature of the water in each can and then set the cans in front of a fan.



The student recorded the temperature in each can every 60 seconds for 10 minutes. No change in temperature was observed in any of the cans.

36. The student decided to revise the experiment. Which revision would most likely help the student improve the experiment?
- A. Using larger cans
 - B. Filling each can with hot water
 - C. Wrapping each can with both wool and plastic
 - D. Recording the temperature every 20 seconds for 10 minutes
-
37. How much heat energy is required to raise the temperature of 4.00 kg of copper from 25°C to 45°C?
- Note: Specific heat capacity of copper = 390 J/kg•°C.
- A. 70 200 J
 - B. 39 000 J
 - C. 31 200 J
 - D. 1 560 J

Use the following information to answer questions 38 and 39.

When 0.10 kg of water was heated over a candle, the following data were collected:

initial temperature of the water	25.0°C
final temperature of the water	31.0°C
mass of the candle before burning	28.96 g
mass of the candle after burning	28.91 g

38. The specific heat capacity of water is $4\,200\text{ J/kg}\cdot^{\circ}\text{C}$. The amount of heat required to heat the water was
- A. 420 J
 - B. 1 260 J
 - C. 2 520 J
 - D. 10 500 J
39. If 0.20 kg of water had been heated from 25.0°C to 31.0°C using the same candle, the mass of the candle that likely would have burned is
- A. 1.00 g
 - B. 0.10 g
 - C. 0.05 g
 - D. 0.02 g
-
40. More heat is required to raise the temperature of 1 g of water by 1°C than to raise the temperature of 1 g of iron by 1°C. This suggests that the heat capacity of water
- A. depends on the heat capacity of iron
 - B. is less than the heat capacity of iron
 - C. is greater than the heat capacity of iron
 - D. is manipulated by the heat capacity of iron

Use the following information to answer question 41.

15 kJ of heat were added to each of the two liquids X and Y. The temperature of Liquid X rose 10°C and the temperature of Liquid Y rose 14°C . Consider the following statements about liquids X and Y:

- I Liquids X and Y have the same mass and the same specific heat capacity.
- II Liquids X and Y have the same mass but different specific heat capacities.
- III Liquids X and Y have the same specific heat capacity but different masses.
- IV Liquids X and Y have different specific heat capacities and different masses.

41. Which of the above statements could be true?

- A. I, II, and III
 - B. I, II, and IV
 - C. I, III, and IV
 - D. II, III, and IV
-

Use the following information to answer question 42.

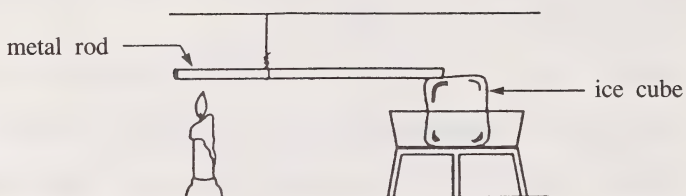
A student mixed two equal masses of hot and cold water. The initial temperatures of the hot and cold water were 30°C and 18°C respectively.

42. Assuming that no heat was lost to the surroundings, the final temperature of the mixture is predicted to be

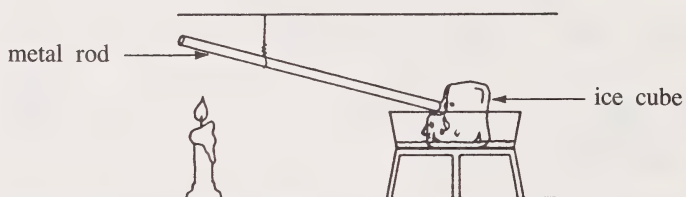
- A. 28°C
 - B. 26°C
 - C. 24°C
 - D. 22°C
-

Use the following information to answer question 43.

A student set up the system illustrated in the diagram.



The diagram below shows the system 10 minutes later.



The student made some observations and some inferences from the experiment:


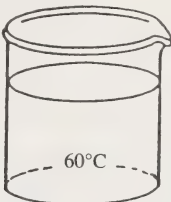
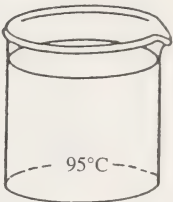
- I The shape of the ice cube changed.
- II The ice started to melt.
- III The end of the rod on the ice became hot because heat was transferred by molecular collisions in the rod.
- IV Heat was being transferred from the flame through the rod to the ice.

43. Which two statements are observations?

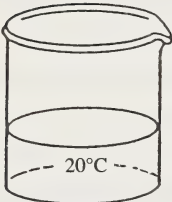
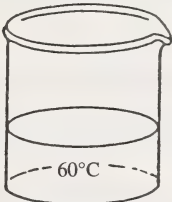
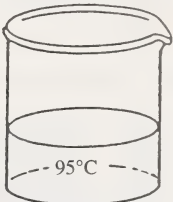
- A. I and II
 - B. I and III
 - C. II and IV
 - D. III and IV
-

44. Which set of controlled variables would provide the most reliable data to test the hypothesis that hot water freezes faster than cold water?

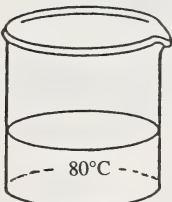
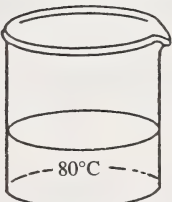
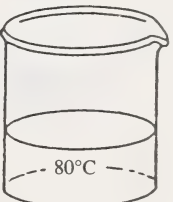
A.

I	II	III
		
Glass Beaker	Glass Beaker	Glass Beaker


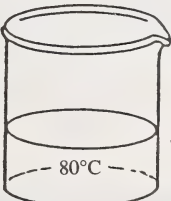
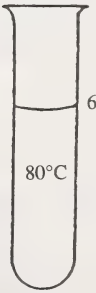
B.

I	II	III
		
Glass Beaker	Glass Beaker	Glass Beaker

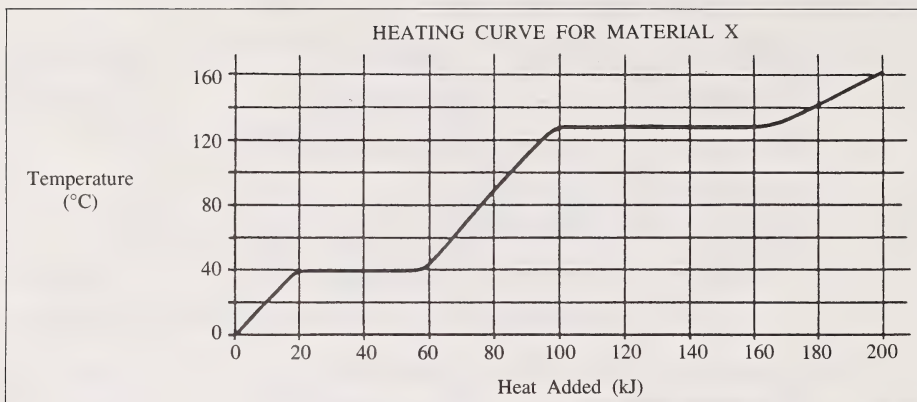
C.

I	II	III
		
Copper Beaker	Glass Beaker	Plastic Beaker

D.

I	II	III
		
Glass Graduated Cylinder	Glass Beaker	Glass Test Tube

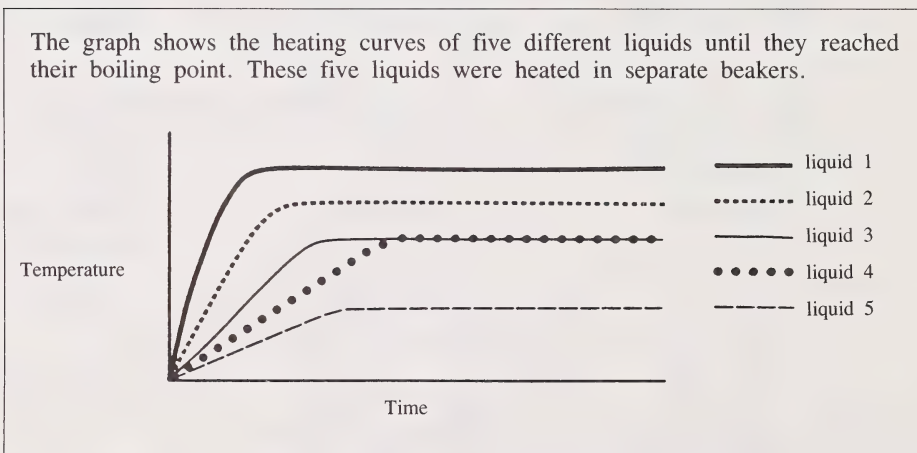
Use the following information to answer question 45.



45. If heat were removed from Material X at 160°C, what process might take place?

- A. Condensation
- B. Vaporization
- C. Dissolving
- D. Melting

Use the following information to answer question 46.



46. Which liquids could be identified individually just by their boiling points?

- A. 1, 2, and 3
- B. 1, 2, and 5
- C. 2, 3, and 4
- D. 2, 3, and 5

47. When a substance is heated and does NOT undergo a change of state,
- A. its molecules move closer together
 - B. it undergoes a change in mass
 - C. it increases in temperature
 - D. it decreases in volume
48. In explaining expansion, the Kinetic Molecular Theory states that
- A. kinetic energy breaks up molecules, which requires more volume
 - B. heat increases the intermolecular force, causing a substance to expand
 - C. a substance absorbs heat energy, which increases the size of the substance
 - D. the kinetic energy of molecules increases, causing greater vibration and larger spaces between molecules
-

Use the following information to answer question 49.

A gasoline tank above the ground is completely filled in the winter. On warm days in the spring, it is noticed that gasoline leaks out of the top of the tank.

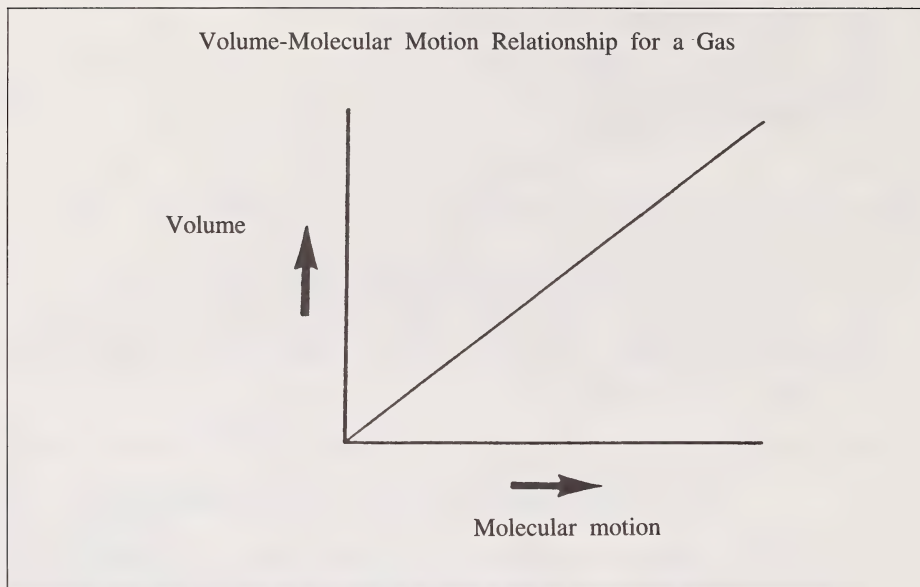
49. The BEST explanation for this observation is that the increase in temperature causes the gasoline to
- A. expand
 - B. contract
 - C. condense
 - D. evaporate
-

Use the following information to answer question 50.

A student filled three identical glass containers; one with water, one with soda pop, and one with orange juice. The containers were sealed and placed in a freezer for several days. Each container broke. The student concluded that ALL liquids expand when frozen.

50. The student's conclusion is
- A. supported by the observations but further evidence is needed
 - B. supported by the observations and no further evidence is needed
 - C. not supported by the observations but further evidence is needed
 - D. not supported by the observations and no further evidence is needed
-

Use the following information to answer question 51.



51. An inference that can be made from this graph is that the volume of gases
- A. contracts nonuniformly as molecular motion decreases
 - B. expands nonuniformly as molecular motion decreases
 - C. contracts uniformly as molecular motion increases
 - D. expands uniformly as molecular motion increases
-
52. All energy may be described as either
- A. kinetic or heat
 - B. heat or thermal
 - C. thermal or potential
 - D. potential or kinetic
53. Which term BEST describes the type of energy contained in water stored behind a dam?
- A. Mechanical energy
 - B. Chemical energy
 - C. Potential energy
 - D. Kinetic energy

Use the following information to answer question 54.

10 mL
20°C

10 mL
20°C

20 mL
32°C

10 mL of clear Substance X at 20°C and 10 mL of clear Substance Y at 20°C were mixed together in a larger container. The final temperature of the resulting liquid was 32°C.

54. The hypothesis that could explain the rise in temperature is that a
- A. chemical change occurred and chemical energy was converted to heat energy
 - B. chemical change occurred and heat energy was converted to chemical energy
 - C. physical change occurred and heat energy was converted to chemical energy
 - D. physical change occurred and potential energy was converted to heat energy
-
55. A solar-powered calculator is an example of the conversion of
- A. potential energy to electrical energy
 - B. mechanical energy to light energy
 - C. light energy to electrical energy
 - D. light energy to thermal energy

56. The food we eat provides us with body heat, allows us to remain active, and helps to build tissue. Which of the following concepts best explains this statement?
- A. Heat is measured indirectly by the effects it produces.
 - B. One form of energy can be changed into another form.
 - C. Heat can be explained in terms of molecular motion.
 - D. Energy can be either kinetic or potential.

Use the following information to answer questions 57 and 58.

A Grade 9 Science class performed the following experiment:

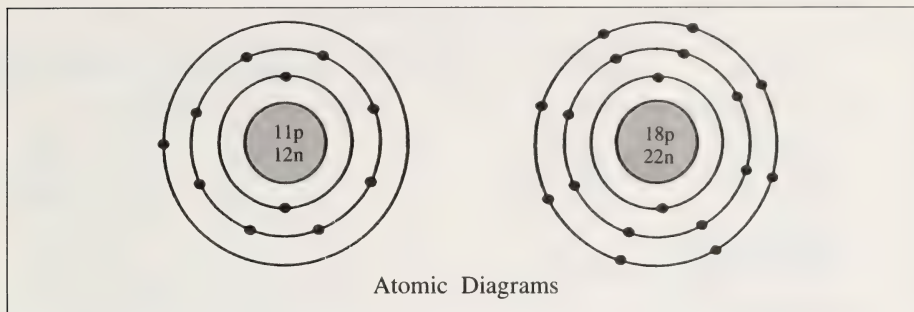
1. Lead shot was placed in closed cylinders.
2. The cylinders were shaken and the shot moved completely up and down with each shake.
3. The temperature of the shot was recorded before shaking, after 100 shakes, after 200 shakes, and after 300 shakes.

The following data were collected:

Student Group	Initial Temperature (°C)	Temperature After 100 Shakes (°C)	Temperature After 200 Shakes (°C)	Temperature After 300 Shakes (°C)
I	23	25	27	29
II	23	26	28	30
III	23	24	27	29
IV	23	25	27	29
V	23	24	25	26

57. Such experimental data provide evidence that
- A. heat energy may be destroyed
 - B. mechanical energy may be destroyed
 - C. heat energy may be changed to mechanical energy
 - D. mechanical energy may be changed to heat energy
58. Which group likely used a shorter cylinder than the other groups?
- A. I
 - B. III
 - C. IV
 - D. V
-

Use the following information to answer question 59.



59. A reason why the two diagrams represent atoms is that the number of
- A. protons is equal to the number of neutrons
 - B. electrons is equal to the number of protons
 - C. electrons is equal to the number of neutrons
 - D. protons and neutrons is equal to the number of electrons
-

Use the following information to answer question 60.

Some Properties of Atomic Particles

- I They have a charge.
- II They are all approximately the same mass.
- III They are found in the nucleus.
- IV They must be present in equal amounts in the atoms for the atom to be neutral in charge.

60. The properties shared by a proton and an electron are
- A. I and II
 - B. I and IV
 - C. II and III
 - D. III and IV
-

Use the following information to answer question 61.

Element	Number of Protons	Number of Neutrons	Number of Electrons	Atomic Mass
Sulphur	16	16	16	32
Lead	82	125	82	207
Radium			88	226
Xenon	54	77		
Plutonium		150		244
Iridium	77			192

61. Of the elements in the table with a smaller atomic mass than Iridium, predict which has the greatest atomic mass.

A. Lead
B. Xenon
C. Radium
D. Sulphur

62. Hydrogen and oxygen can combine to form water, but they can also form hydrogen peroxide. This is evidence that

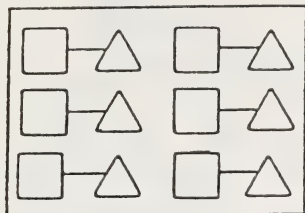
A. atoms of the same element can be dissimilar
B. atoms lose their identity in chemical reactions
C. different atoms can produce different compounds
D. different combinations of the same atoms can produce different compounds

63. The number of atoms in one molecule of sulphuric acid (H_2SO_4) is

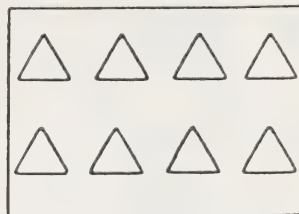
A. 1
B. 3
C. 5
D. 7

Use the following information to answer question 64.

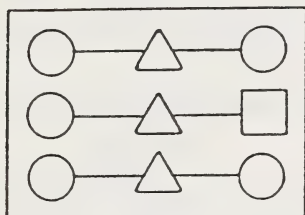
In the models shown, the individual shapes represent atoms. The shapes joined by lines represent molecules.



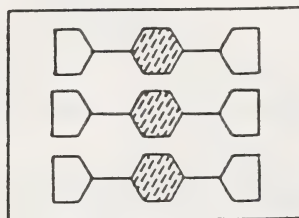
I



II



III



IV

64. Which boxes contain only ONE compound?

- A. I and III
- B. I and IV
- C. II and III
- D. II and IV

65. In a chemical change, atoms are

- A. created
- B. destroyed
- C. rearranged
- D. increased in number

Use the following information to answer question 66.

A student had three clear liquids, labelled X, Y, and Z, and combined them in four different ways. The student made the following observations:

<u>Combination</u>	<u>Observation</u>
I X + Y	- Turns milky white - Slight rise in temperature
II X + Z	- Stays clear - Significant rise in temperature
III Y + Z	- Stays clear - No measurable change in temperature
IV X + Y + Z	- Turns milky white - Significant rise in temperature

66. From the data, the student can interpret that a chemical reaction took place in
- A. I, II, and III
 - B. I, II, and IV
 - C. I, III, and IV
 - D. II, III, and IV
-
67. A student had three clear, colorless liquids, one of which was water. Which statement would be MOST useful in identifying the liquid that was water?
- A. Water may exist as a solid, liquid, or gas.
 - B. Water is a clear, colorless, and odorless liquid.
 - C. Water, in liquid form, takes the shape of its container.
 - D. Water is a clear, colorless liquid that freezes at 0°C and boils at 100°C.
68. Before carrying out an experiment, a student made the following statement: “When Substance X and Substance Y are heated together, the material formed will be magnetic.” This statement is
- A. a conclusion
 - B. a hypothesis
 - C. an observation
 - D. an operational definition

69. Which diagram illustrates the safest method of heating a liquid in a test tube?

A.



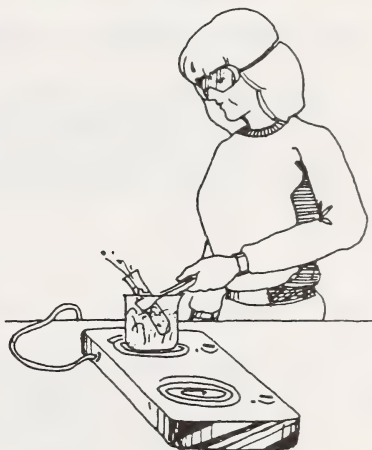
B.



C.

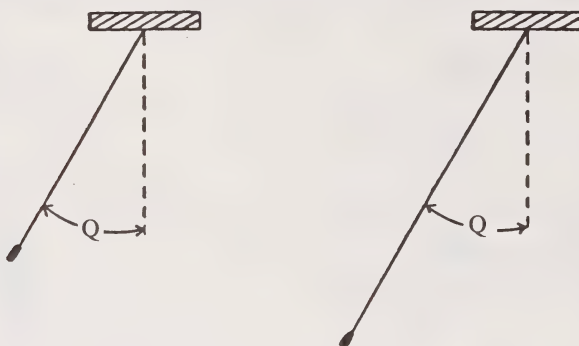


D.



Use the following information to answer questions 70 and 71.

A group of students investigating pendulums used the experimental design illustrated.



Each pendulum was pulled through Angle Q and released. The number of swings in one minute was recorded.

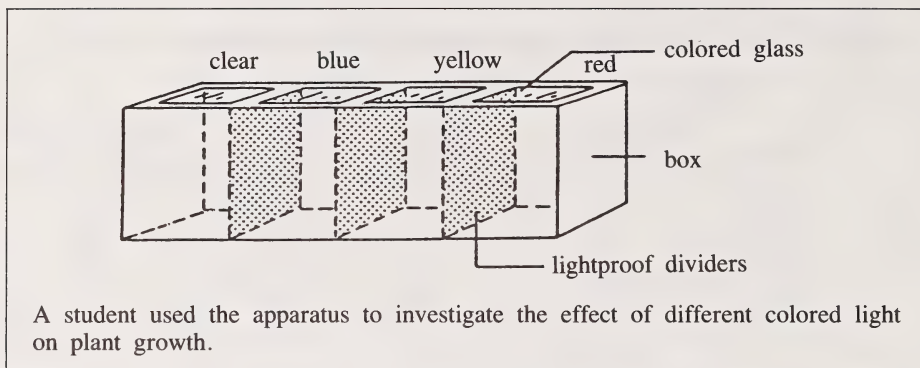
70. Identify the question that BEST describes the problem being investigated.
- A. Does the mass of the pendulum affect the rate at which it swings?
 - B. Does the length of the pendulum affect the rate at which it swings?
 - C. Does the type of wire used affect the rate at which the pendulum swings?
 - D. Does the angle through which the pendulum is pulled affect the rate at which it swings?
71. The effect of human error in this investigation could be reduced by
- A. using different timing instruments
 - B. testing each pendulum at different times of the day
 - C. testing each pendulum at various locations in the building
 - D. having two students do the counting and using the average of the two values

Use the following information to answer question 72.

Physical Properties of Some Elements				
Element	Number of Protons	Boiling Point (°C)	Melting Point (°C)	Diameter of Atom (10^{-10} m)
Fluorine	9	-188	-220	1.4
Chlorine	17	-35	-101	2.2
Bromine	35	59	-7	2.4
Iodine	53	184	114	2.7

72. The BEST inference than can be made from the table is that
- A. the boiling point decreases as the number of protons increases
 - B. the melting point increases as the diameter of the atom increases
 - C. no relationship exists between the number of protons and the diameter of the atom
 - D. no relationship exists between the boiling point, the melting point, and the diameter of the atom
-

Use the following information to answer question 73.



73. Which chart would be the most useful for organizing the data?

A.

Average Height (cm)	
Number of Plants	

B.

Color of Light				
Number of Plants				

C.

Color of Light	
Number of Plants	

D.

Color of Light				
Average Height (cm)				

Use the following information to answer question 74.

Table I lists the energy content stored in the food that a student ate.

TABLE I

<u>Food</u>	<u>Energy Content (kJ)</u>
chocolate bar	530
bag of chips	965
milkshake	1 175
ice-cream sundae	2 390

Table II lists the energy required per hour for various types of activities.

TABLE II

<u>Activity</u>	<u>Energy Required Per Hour (kJ/h)</u>
brisk walking	1 060
bicycling	1 550
swimming	1 800
cross-country skiing	2 900

74. Two hours of brisk walking would completely use up the energy stored in
- A. two milkshakes
 - B. four chocolate bars
 - C. three bags of chips
 - D. one ice-cream sundae
-

Use the following information to answer question 75.

A student attempted to determine the relationship between athletic performance and the level of air pollution. The student monitored pollution levels and runners' times over a 10-day period. The data were recorded on the chart below:

<u>Day</u>	<u>Grams of pollution per 100 000 kg of air</u>	<u>% of runners who ran slower than on Day 1</u>
1	—	—
2	538	50
3	312	20
4	567	40
5	142	10
6	794	77
7	284	18
8	170	8
9	85	12
10	255	19

75. From the chart, the student was able to infer that

- A. as pollution increased, the percentage of runners who ran slower increased
- B. as pollution increased, the percentage of runners who ran slower decreased
- C. as pollution decreased, the percentage of runners who ran slower increased
- D. the more days the athletes ran, the slower they ran



N.L.C. - B.N.C.



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